CHASSIS Lubrication — Lubricate for SAFETY every 1,000 MILES

The Institute Spokesman

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Spicer Universal Joints

CONSTRUCTION, DESIGN AND LUBRICATION REQUIREMENTS OF NEEDLE TYPE JOINTS FOR AUTOMOTIVE VEHICLES

by D. F. KALISH,

Manager of Parts and Service Division, Spicer Mfg. Corp., Toledo, Ohio.

The Spicer Manufacturing Corporation of Toledo, Ohio, pioneered the manufacture of Universal Joints for automobile vehicles, starting in 1904. During all these years, with the many changing conditions under which motor vehicles have been operated—higher speeds, heavier loads and greater operating angles—different types of Joints have become necessary.

Previous to 1933, Plain Bearing Type Universal Joints were in general use on automobiles. This type of Joint required lubrication at intervals of about 2,000 miles with a long fiber universal joint grease. This frequency of lubrication was necessary because the bearing surfaces lost their film of lubricant after about that interval.

In 1933 the Needle Type Universal Joint was developed. The basis of this new design is the Needle Bearing, a long-lived, efficient, cageless roller bearing which gives far greater load capacity, less friction, greater efficiency, larger angular capacity, and much lower operating temperatures. The consistency of the lubricant is thus preserved indefinitely, giving longer life than will be experienced with corresponding sizes of other Joints. Lubrication intervals are lengthened out indefinitely and the type of lubricant is changed.

In the Spicer Needle Bearing Type, excellent results are obtained by providing exactly the correct amount of clearance, both between the Needles themselves and the Journal Trunnion and Outer Bearing Race. This construction permits the Needles to roll, under certain load conditions, and under other conditions to move as a unit, resulting in a combination of individual rolling and sliding which is so essential for proper lubrication.

The Spicer Needle Bearing Universal Joints are manufactured in a complete range of sizes and types to meet any and all conditions required by present day automotive construction. A few of many available types and constructions are shown in the accompanying illustrations.

Construction

Primarily the Joint consists of the conventional Journal or Cross with four Needle Bearings with Bearing Caps and Lock Straps to secure the bearing in position and provide against rotation. The lubricant is effectively retained within the bearings by Oil Seals on the Journal Trunnions. This construction confines the actual wear, which may occur after long periods of service and overloading, to the Needle Bearing and Journal. These are the only two parts which move relative to each other when the Joint is in action, other than the Spline moving within the Sleeve Yoke.

Thrust

The thrust of the drive is taken between the hardened and ground ends of the Journal and the hardened and ground bottom of the Needle Bearing Race, thereby reducing friction. The provisions made for taking the thrust in the Spicer design does away with rapid wear, resulting from improperly lubricated surfaces between the Yokes and Journal faces and eliminates heavy overloading.

Bearing Retention

Three methods of retaining the Needle Bearing Assemblies in the Joints are used:

(a) The Snap Ring Type—Used on Passenger Cars and Light Trucks. The Bearings are a press fit in the Yokes and are retained by a snap ring fitted in grooves in the Crossholes of the Yokes.

(b) The U-Bolt Type—Used on Passenger Cars only, starting with 1936 car production. Bearings are a tight fit between shoulders on End Yokes and clamped solidly in position by U-Bolt.

(c) The Bearing Cap Type—For Heavy Duty. Bearings are a sliding fit in Yokes. Bearing Caps are provided with a key on the face, which fits into a keyway cut in the end of the Bearing to prevent rotation of Bearing. Two Bolts secure each cap rigidly in position locked by a Lock Strap.

Lubrication

In the Needle Bearing Type, due to centrifugal force, the higher the speed, the better the lubrication. The Journal is provided with four oil reservoirs in the ends of the Trunnions, which lead directly into the Needle Bearings. The Heavy Duty sizes are lubricated at one central point fitted for high pressure lubrication, from which the lubricant leads through four oil

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CONVENTION HIGHLIGHTS

Wide interest was shown by the well attended sessions of the 6th Annual Convention of the National Lubricating Grease Institute. Space allows us to give here only a brief summary of the addresses which helped make the Convention an unqualified success. The entire membership of the Institute joins in expressing sincere appreciation to the speakers and exhibitors for their splendid cooperation. Exhibitors were Draper Mfg. Co., Wilson and Bennett Mfg. Co., Stewart-Warner Corp., Chek-Chart Inc., Wackman Welded Ware Co.

Chemical and Physical Evaluation of Lubricating Greases

W. A. Lutz and H. A. Ambrose, Gulf Research & Development Co. and W. A. Gruse, Mellon Institute of Industrial Research.

This instructive paper covers the subject of grease manufacturer from basic conditions, structure, consistency, chemical stability, oxidation stability to specification and service.

Hobnobbing with the Man on the Street

Frank W. Lovejoy, Socony-Vacuum Oil Co., New York, N. Y.

A very interesting and instructive talk on what Mr. Lovejoy termed "Merchandi-Zing". This talk was all too short and we are sorry to report—no copies available due to the fact that it was extemporaneous and in compliance with Mr. Lovejoy's request no notes were taken.

Rapid Methods for Determination of Oil in Lubricating Greases

C. J. Boner, L. W. Yagle and G. A. Williams, Battenfeld Grease & Oil Corp., Kansas City, Mo.

Confronted with the problem of obtaining results as promptly as possible, methods as outlined in this paper have been devised for the separation of oils from lubricating greases which consume less time and are more simple than the standard ASTM method. Claim is made an oil of same purity and characteristics can be obtained as by use of standard method.

Application Equipment for Automotive Greases

Charles A. Fine, Stewart-Warner Corp., Chicago, Ill.

A comprehensive discussion on the subject of the development of modern lubrication devices and their functions in the utility and sale of lubricants.

Grease Application Eauipment in the Industrial Field

M. J. Helmes, Sales Mgr. Lubricator Division, United American Bosch Corporation, Springfield, Mass.

Mr. Helme's paper gives us the history of development in grease application equipment in the Industrial field showing the progress made in the proper application of lubricating greases to industrial equipment.

Wheel Bearing Lubrication from Manufacturers' Viewpoint

O. L. Maag, Lubricating Engineer, The Timken Roller Bearing Company.

A subject of great interest in the lubrication field. Mr. Maag gives us an exhaustive review of this phase of lubrication covering types of greases, service requirements, etc.

Wheel Bearing Lubrication from the Service Viewpoint

W. P. Eddy, Jr., Metallurgical and Service Engineer, Yellow Truck and Coach Manufacturing Company, Pontiac, Mich.

Covers development of wheel bearing greases, specifications, lubricating practices, service performance of bearings, future trends and developments—method of grease application. Very informative and instructive.

Laboratory Methods of Evaluating Greases

Gus Kaufman, The Texas Company, Beacon, N. Y.

Covers the work on the development of improved lubricants for ball and roller bearings, and means of evaluation of reasonable accuracy and simplicity which could be performed in the laboratory. A comprehensive description of apparatus and test procedure.

Chassis Lubrication

Dr. W. S. James, Chief Engineer, The Studebaker Corporation, South Bend, Ind.

A frank discussion on the subject of availability of information on lubricants, lubrication and distribution and a sincere appeal for closer cooperation between car manufacturer and grease manufacturer — a discussion that should be given further thought and study.

Hypoid Lubrication

W. R. Griswold, Packard Motor Car Co., Detroit, Mich.

Mr. Griswold ably covered this important subject from the manufacture of the hypoid gear, its use and proper lubrication requirements to be met and future trends and developments.

Steel Mill Grease Lubrication

F. L. Gray, Testing and Lubrication Engineer, Carnegie-Illinois Steel Corporation, Gary, Ind.

A subject of wide interest to the grease manufacturer, Mr. Gray very clearly gives us a picture of the requirements of the present day steel mill as compared to the older type mills.

NOTICE

COPIES OF COMPLETE PAPERS CAN BE OBTAINED AT ACTUAL COST. $1.50 for set of 10 or 25c for individual copies. Address your request and remittance to Executive Secretary, National Lubricating Grease Institute, 498 Winspear, Buffalo, N. Y.

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channels direct to the four oil reservoirs in the ends of the Trunnions. As the Joint revolves, the lubricant is forced by centrifugal action directly into the Needle Bearings where it is actually required. The outside ends of the Needle Bearing Races are made solid; therefore, the lubricant cannot escape. Oil Seals, between the shoulders on the Journal and the Needle Bearings, effectually protect against oil leakage and ingress of foreign matter.

These Heavy Duty Joints can be run many thousands of miles without additional lubricant but they should, as a matter of precaution, be lubricated every 5,000 to 8,000 miles, depending upon the service to which they are subjected. While this may be more frequent lubrication than necessary, there will be no waste of lubricant or damage to the oil seals when extremely high pressure is used in forcing in the lubricant, as the Relief Valve will expel any excess lubricant, indicating at the same time that the Joint is completely filled.

The Passenger Car sizes are not fitted for high pressure lubrication, but have four oil reservoirs in the ends of the Trunnions, which are packed with lubricant at the time the Joint is assembled at the factory. They should be disassembled for re-lubrication after approximately every 15,000 miles of service, or once a season when the car is overhauled.

Where Joints are disassembled for re-lubrication, care should be taken that the Needle Rollers do not fall out. Disassembling should be done only by a competent mechanic having the necessary equipment.

For the type of Universal Joint used on Light Trucks and Buses and Extra Heavy Passenger Cars, frequent lubrication is desirable. These Joints have provision for lubrication similar to that on the Heavy Duty Truck and Bus Type.

Lubricant

All Spicer Needle Bearing Joints should be lubricated with a good grade of mineral base lubricant the consistency of SAE 140. Do not use heavy grease. Heavy grease tends to destroy the Needle Bearings. It is of such density that it may clog the oil passages; also, it will not work in between the rollers and cannot lubricate properly either the rollers or the serrated ends of the Journal Trunnions, which require lubrication on the thrust surfaces.

The sliding Spline Shaft on all Spicer Joints should be lubricated with a good grade of grease or gear oil every 2,000 to 3,000 miles, or every time the chassis is lubricated. A threaded hole is provided in the Yoke for the installation of a high pressure fitting by means of which the Spline Shaft is lubricated.

EDITOR'S NOTES—This story gives a remarkably clear picture of the types of universal joints used on present day cars and their proper lubrication. The lubrication recommendations are given as the Spicer factory indicates. It is to be noted, however, that in some cases, car factories take a modified viewpoint of the type of lubricant and the mileage interval at which lubrication is necessary. These differences are not to be taken as contradictory, but rather as taking into consideration the other factors of speed, power transmitted, acceleration, backlash and other factors. Also, each oil company naturally takes into consideration the physical characteristics of its own products in making recommendations.

Previewing the 1939 Cars ★

DETROIT, MICH. Chrysler, Dodge, De Soto and Plymouth 1939 new models were unveiled to press members. This preview was a departure from the past press previews in that the Chrysler Corporation was the host instead of each of the various units having an individual showing.

While we are not yet permitted to point out the numerous new features built into the 1939 models, we can say that when announcement is made, the public will have a real surprise, as there are several radical changes in design.

SOUTH BEND, IND. The press previewed the new 1939 Studebaker State President and the Commander under the guidance of President Hoffman and various high executives of the Engineering and Service Departments. Radically changed appearance in the complete redesign of the body is quite apparent. The gear shift lever is mounted on the steering column. The battery has been moved up under the hood on the left side. Transmission overdrive continues to be a feature. Engineering improvements indicate better performance, speed and acceleration.

DETROIT, MICH. The Graham preview disclosed the 1939 models again featuring the supercharger. Important facts were given out indicating substantial progress in the tractor end of the business, and refinancing that will definitely put Graham in the 1939 picture as a serious contender in the middle price class.

LANSING, MICH. The press party of nearly 250 came here today as Oldsmobile's guests to hear this pioneer company's plans for 1939 and inspect the new models. As the release date is late in October, details cannot be divulged now, but it can be told that the line very definitely includes an eight, contrary to rumor. Brilliant new design throughout, and several fundamental design changes feature Oldsmobile for 1939.

PONTIAC, MICH. The Pontiac organization disclosed to the press today their new lines for 1939, showing some revolutionary changes in appearance and many innovations mechanically. Alfred E. Sloan, Jr., head of General Motors, spoke to the group and said it was the feeling in the industry that if war could be averted and if labor troubles did not block production, the industry would be able to go ahead on a 25% increase over 1938 production. He said that all lines of cars, General Motors and otherwise, were on a very low inventory basis and that used car stocks were in very satisfactory condition. Consequently, all 1939 models should start to sell immediately upon their announcement.

LAKE GENEVA, WIS. Almost under the watchful eye of the great telescope of the Yerkes Observatory, Nash presented to the press a pre-showing of the Nash and LaFayette models for 1939. The new models are replete with changed appearance and engineering innovations, the details of which cannot be released until the cars are publicly announced on October 30th. We can, however, say that Nash has "got something" for 1939.

DETROIT, MICH. Packard dealers, distributors and salesmen numbering over three thousand, together with representatives of the press, spent the entire day hearing and seeing a presentation of Packard 1939 models and plans. The group filled the Masonic Temple here to the doors and later the entire gathering was taken to the Packard proving grounds to see the cars do their stuff.

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DETROIT, MICH. The press today met with Hudson officials at the Statler Hotel to discuss 1939 plans and models. Beginning October 1st, regional service supervisors will meet to organize service training and the new cars will be announced during the month.

FLINT, MICH. Buick men from all parts of the country are gathering here to get details of the new Buicks and to prepare 1939 plans. A great three-day Flint Mardi Gras is being held here, attended by 20,000 people, to celebrate Flint's recovery from the economic recession and the return to work of more than 8,000 people.

DETROIT, MICH. Hupmobile was host to the press at the Grosse Point Yacht Club. The plant is being made ready to start production on the first of the 1939 models with other surprises toward the first of the year.

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Other car makers are either having their preview at a later date or have made no announcements.

National Release Dates for 1939 Models

Although some 1939 models are actually being sold in certain localities where 1938 models are all sold out, national release dates have been set (subject to change) by the car factories as follows:

American Bantam	Nov. 11
Buick	Oct. 7
Cadillac	Nov. 11
Chevrolet	Oct. 22
Chrysler	Oct. 6
De Soto	Oct. 6
Dodge	Oct. 6
Ford	Not announced
Graham	Not announced
Hudson	Nov. 11
Hupmobile	Oct. 1
LaSalle	Nov. 11
Lincoln	Oct. 20
Lincoln Zephyr	Oct. 20
Nash	Oct. 30
Oldsmobile	Oct. 21
Packard	Oct. 2
Plymouth	Sept. 24
Pontiac	Oct. 14
Studebaker	Oct. 1
Willys	Not announced

Automobile Shows

Nov. 11-17—National Motor Truck Show, New York
Nov. 11-18—National Automobile Show, New York
Nov. 11-18—Pittsburgh Automobile Show
Nov. 11-19—Detroit Automobile Show
Nov. 12-18—Columbus Automobile Show
Nov. 12-19—Boston Automobile Show
Nov. 12-19—Buffalo Automobile Show
Nov. 12-19—Chicago Automobile Show
Nov. 12-19—Milwaukee Automobile Show
Nov. 12-19—Minneapolis Automobile Show
*Nov. 12-19—Philadelphia Automobile Show
*Nov. 12-19—San Francisco Automobile Show
Nov. 12-20—Los Angeles Automobile Show
*Nov. 12-20—St. Louis Automobile Show
*Nov. 14-19—Elmira, N. Y. Automobile Show
Nov. 14-19—New Haven, Conn., Automobile Show
Nov. 19-25—Indianapolis Automobile Show
Nov. 19-26—Baltimore Automobile Show
Nov. 19-26—Montreal, Canada, Automobile Show
Nov. 19-26—Rochester, N. Y., Automobile Show
*Nov. 19-26—Washington, D. C., Automobile Show
*Nov. 20-26—Cincinnati Automobile Show
Nov. 26-Dec. 3—Newark, N. J., Automobile Show
Nov. 26-Dec. 3—National Motor Show of Canada, Toronto, Ont.
Dec. 5-10—Denver, Colo., Automobile Show

*Tentative.

The 1939 Plymouth

New engine design and outstanding appearance changes are featured by Plymouth this year. There are a number of lubrication changes, most of which are in the front end. Individually suspended front wheels do away with the former leaf springs at the front end. Headlamps are in the front fenders. The gear shift lever on the DeLuxe model (P8) is to be found on the steering column, but on the Roadking model (P7) it is in the conventional position. Hypoid gears are retained. Mileage recommendations for starter and generator are raised to 6,000 miles to prevent damage from overlubrication. This change was put through on 1938 models last April. The total number of lubrication points on the 1939 models is 43, compared to 36 for the 1938 model. This increase is occasioned by the new points on the new front end design.

Hupmobile to Have Two Lines

Hupmobile models for 1939 will start out with two chassis, a six and an eight. Later on, a lower priced six will be introduced and shortly after the first of the year the company plans getting into production with a four.

Packard Has Four Lines for 1939

The Packard models for 1939 are the Six, the 120 (Eight), the Super Eight and the Twelve. While quite similar to 1938 models from a lubrication standpoint, a number of detail changes have been made, including the use of a fifth shock absorber on the rear stabilizer bar.

New Studebaker Lines

Announced October 1st, the new Studebaker lines are the State President and the Commander. Extensive changes have been made in lubrication points around the Planar front suspension, including changes in number and location of fittings and the use of a new design shock absorber.

Time to Change Lubricants

Twice a year the lubrication industry gets a great opportunity to render its customers a great service with profit to itself. October and November are the months for seasonal change-over to winter lubricants in crankcase, transmission and differential. April and May are the months to change to summer grades.

Along with this seasonal change is a chance to present other timely services. Here is a list. Ask 'em to buy. Some one will sell 'em—why not you?

Crankcase oil change
Transmission lubricant change
Differential lubricant change
Chassis lubrication
Wheel Bearing lubrication
Spring lubrication

Check for replacement of battery, tires, windshield wiper arms, lamp bulbs, battery cables and other equipment which you handle.

While there is a lot of interest in the new 1939 cars, don't forget that the greatest marketing opportunity for your services and your products is in the cars of 1938 and back which are already on the road and have put on a lot of mileage.

Anti-freeze business is also just around the corner. In northern climates, skid chains, robes and other winter needs help swell the cash register total.

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